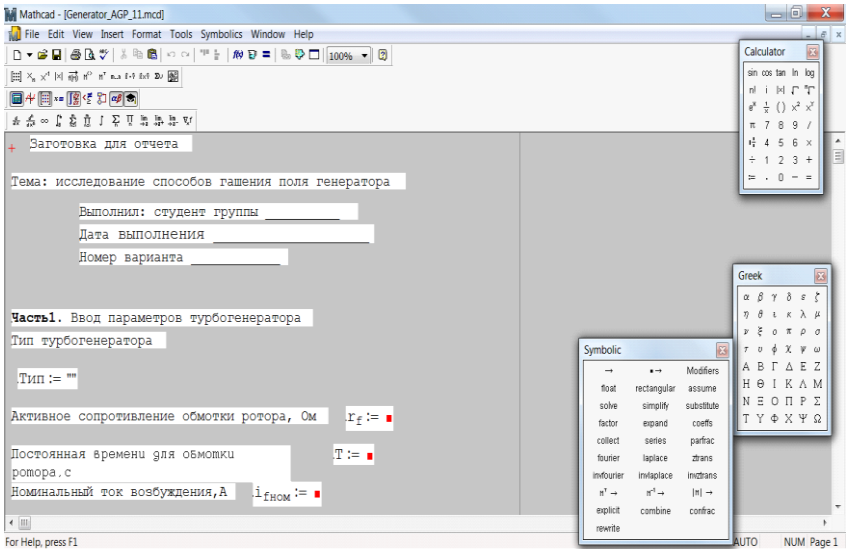
# PROGRAM DESIGN FOR RESEARCH DAMPENING FIELD GENERATOR

**I. Efremov, N. Kosmynina**
*Tomsk Polytechnic University*

Dampening field is a process of rapid decrease of the magnetic flux of the generator excitation to a value close to zero. Magnetic field dampening has a special value in emergency state resulting damage inside the generator or on its connection terminals. Rapid field dampening is necessary to limit breakdown size.

Depending on the power generator and the characteristics of its excitation system three mode to magnetic field killing are used: callousing excitation winding to the resistor; field killing using arc chute; opposition excitation [1].

The program for the study of all the methods of field-killing was developed at the Department of Electric Power Systems Institute of Power Engineering, including optimal conditions in Mathcad. Program fragment shown in *Picture 1*.



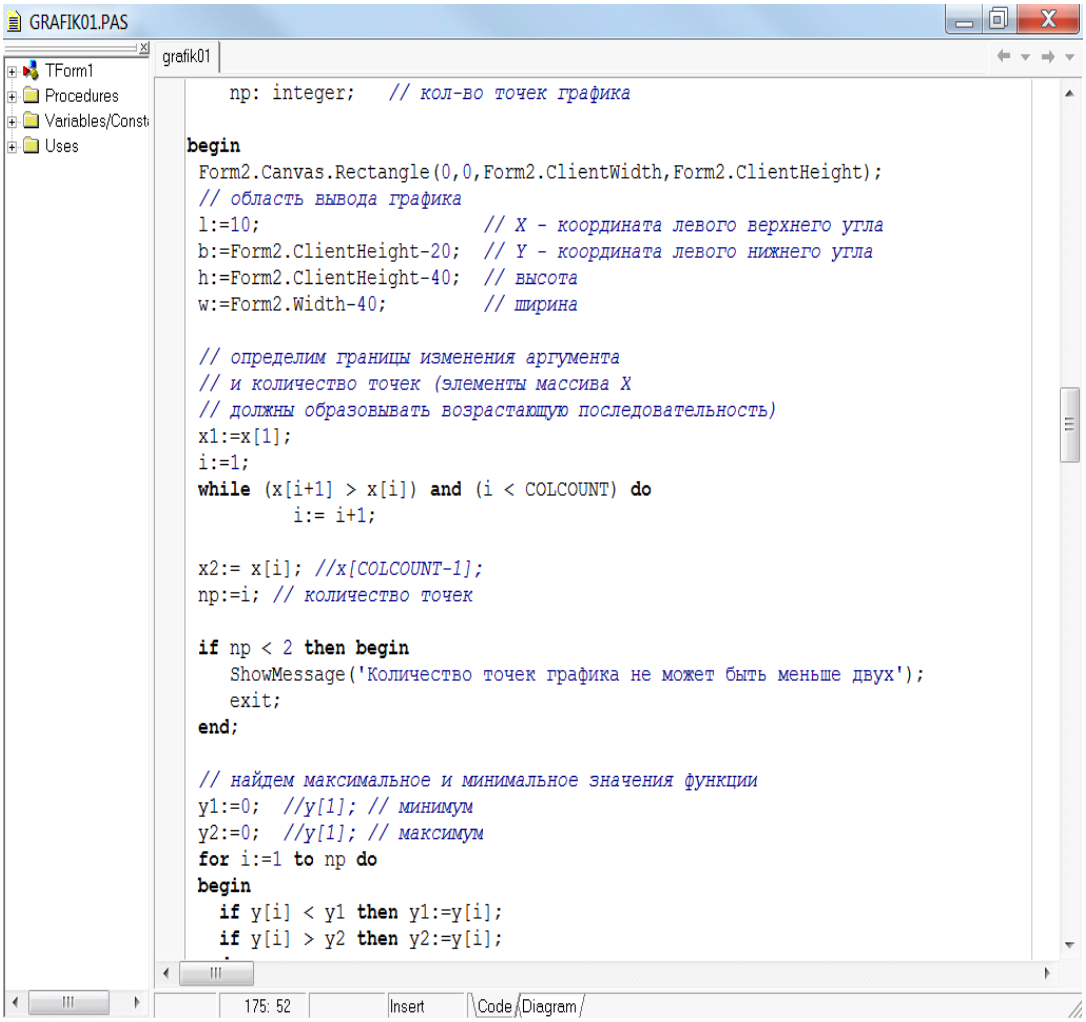

Pic. 1. Program Mathcad home page

You can see at the picture user has to entry only data. On the basis of program calculations the student compares different methods field killing and concludes the best method.

The increase in of education process active component is required for the preparation of highly qualified specialists in modern conditions.

The creation work of new program in Delphi field which has wide capabilities for possible creation of accessible interface is done to actively engage students in the process of learning subject [3].

*Picture 2* shows a fragment of code.



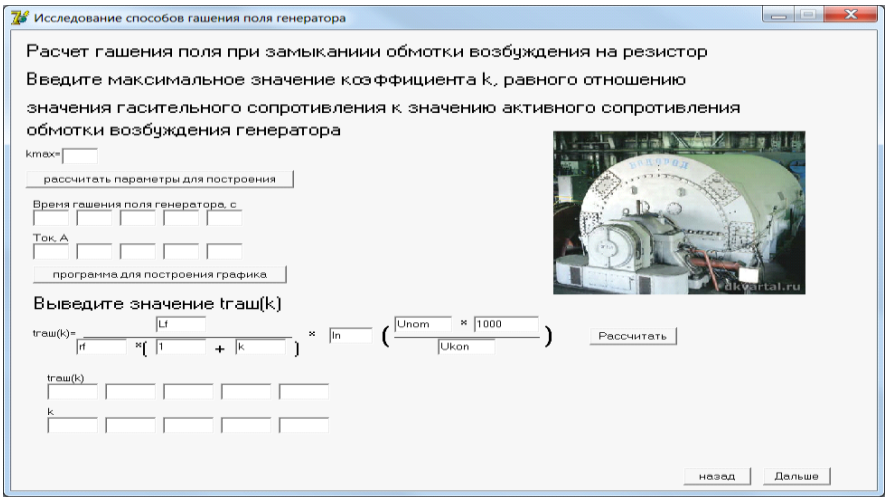

Pic. 2. Detail of the program code (block plotting).

The main feature of the program is that the student must enter the calculated expression – the window of calculation expression is shown in *Picture 3*.

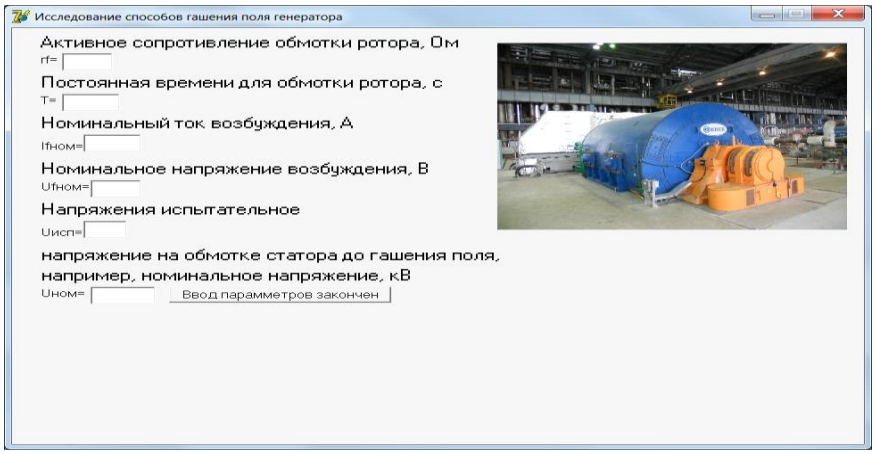
The further stage of the program is possible after passing the test of entered expression .

The check of input initial data on the adjacent reference value envisaged in the program [2].

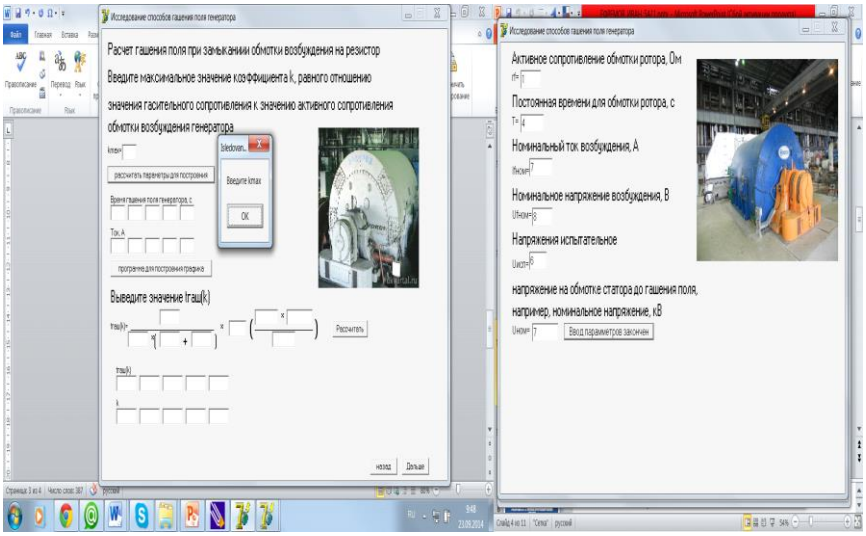
*Pictures 4,5* present the working window of the program: initial data input, verification of erroneous data entry.




Pic. 3. Example of calculation expressions input




Pic. 4. Data input  window




Pic. 5: Example  of checking erroneous data entry

The check of input initial data on the adjacent reference value envisaged in the program [2].

Currently program checkout is carried out. After its completion the registration of the software and implementation in the educational process is planned for students directions 140400.

REFERENCES

1. Electrical equipment of power stations and substations: the textbook / L.D. Rozhkov, L.K. Karneeva, T. Chirkova. – Moscow: Academy, 2004. – 448 p.
2. Electrical power plants and substations. Reference materials for the course and diploma projects: training in Training Manual / BN Neklepaev, IP Kryuchkov: Tutorial / BN no-rivet, IP Kryuchkov. – 5th ed., Sr. – St. Petersburg: BHV-Petersburg, 2013. – 607 p.
3. Kultin N B The basics of programming in Delphi 7. – St. Petersburg: BHV-Petersburg, 2007 – 594 p.

## SMART HOUSE HYBRID

**A. Filyukov, A. Buran**
*Tomsk Polytechnic University*

Energy resources deficiency is one of the global challenges in the modern world. Energy consumption increases every year, although the resources of our planet are limited. Nowadays, energy and construction companies try to find the solution to this problem. They invent, apply and integrate technologies which will help not only keep Earth's energy resources, but also create surplus necessary for different purposes. One of the technologies is Smart House Hybrid technology. It represents an application of advanced technologies in the field of alternative energy resources and absolute automation.

*Experimental setup and methods*. We've conducted a research concerning the systems of "Smart House Hybrid" and we've got figures proving an efficient use of energy resources. The first system to be checked was water-heating system.

The Main Systems of "Smart House Hybrid"